

WHAT IS CLAIMED IS:

1 . An exposure apparatus comprising a vacuum chamber and an optical system, which includes an extreme ultraviolet radiation source and a photo mask,

wherein said vacuum chamber includes a substrate holder to hold a substrate having a resist film formed on a surface of said substrate, a photo mask holder to hold a photo mask, a gas inlet, a gas outlet, and a removing unit,

said optical system is used for exposing the resist film to extreme ultraviolet radiation via said photo mask in said vacuum chamber, in which a desired pattern has been formed, and thereby transferring the pattern from said photo mask onto the resist film; and

said removing unit removes a deposit formed on said photo mask.

2. The exposure apparatus of claim 1, Wherein said substrate holder is provided in a lower region of said vacuum chamber, and said removing unit is provided in an upper region of said vacuum chamber.

3. The exposure apparatus of claim 1, wherein said photo mask holder is provided above said substrate holder, and

said photo mask holder is provided in a different location from said removing unit.

4. The exposure apparatus of claim 1, wherein said removing unit removes said deposit by using plasma generated from a gas induced from said gas inlet.

5. The exposure apparatus of claim 1, wherein said gas outlet allows a gas generated from said removing unit to escape.

6. The exposure apparatus of claim 4, wherein said gas includes oxygen.

7. The exposure apparatus of claim 1, further comprising a reflective mirror in said vacuum chamber, which reflects light from said extreme ultraviolet radiation source to induce said substrate via said photo mask.

8. The exposure apparatus of claim 1, wherein said removing unit is provided between said gas inlet and said gas outlet in said vacuum chamber

9. An exposure apparatus comprising a vacuum chamber and an optical system, which includes an extreme ultraviolet radiation source and a photo mask

wherein said vacuum chamber includes a substrate holder to hold a substrate having a resist film formed on a surface of said substrate, a photo mask holder to hold a photo mask, a gas inlet, a gas outlet, a transfer unit and a removing unit,

said optical system is used for exposing the resist film to extreme ultraviolet radiation via said photo mask in said vacuum chamber, in which a desired pattern has been formed, and thereby transferring the pattern from said photo mask onto the resist film; and

said transfer unit transfers said photo mask from said photo mask holder to said removing unit, and said removing unit removes a deposit formed on said photo mask

10. The exposure apparatus of claim 9, wherein said substrate holder is provided in a lower region of said vacuum chamber, and said removing unit is provided in an upper region of said vacuum chamber.

11. The exposure apparatus of claim 9, wherein said photo mask holder is provided above said substrate holder, and

said photo mask holder is provided in a different location from said removing unit.

12. The exposure apparatus of claim 9, wherein said removing unit removes said deposit by using plasma generated from a gas induced from said gas inlet.

said photo mask holder is provided in a different location from said removing unit.

12. The exposure apparatus of claim 9, wherein said removing unit removes said deposit by using plasma generated from a gas induced from said gas inlet.

13. The exposure apparatus of claim 9, wherein said gas outlet allows a gas generated from said removing unit to escape

14. The exposure apparatus of claim 13, wherein said gas includes oxygen.

15. The exposure apparatus of claim 9, further comprising a reflective mirror in said vacuum chamber, which reflects light from said extreme ultraviolet radiation source to induce said substrate through said photo mask.

16. The exposure apparatus of claim 9, wherein said removing unit is provided between said gas inlet and said gas outlet in said vacuum chamber.